



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO.  |
|---|-------------|----------------------|---------------------|-------------------|
| 09/765,437  | 01/22/2001  | Toshiya Suzuki       | 001764              | 9007              |
| 38834   | 7590        | 12/22/2004           | EXAMINER            |                   |
| WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP<br>1250 CONNECTICUT AVENUE, NW<br>SUITE 700<br>WASHINGTON, DC 20036 |             |                      |                     | GUERRERO, MARIA F |
|   |             | ART UNIT             |                     | PAPER NUMBER      |
|   |             | 2822                 |                     |                   |

DATE MAILED: 12/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

10n

|                              |                        |                     |
|------------------------------|------------------------|---------------------|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|                              | 09/765,437             | SUZUKI, TOSHIYA     |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |
|                              | Maria Guerrero         | 2822                |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 30 September 2004.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-3,5-16,19,21-25,27 and 29-32 is/are pending in the application.
- 4a) Of the above claim(s) 1-3,5-14 and 21-24 is/are withdrawn from consideration.
- 5) Claim(s) 29-32 is/are allowed.
- 6) Claim(s) 15,16,19,25 and 27 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

1. This Office Action is in response to the Amendment filed September 30, 2004.

### **Status of Claims**

2. Claims 4, 17-18, 20, 26, and 28 are canceled. Claims 1-3, 5-16, 19, 21-25, 27, and 29-32 are pending.

### ***Election/Restrictions***

3. Claims 7, 14, and 21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6.

Applicant's election of Species III (claims 15-20 and 25-28) in Paper No. 17 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 1-3, 5-6, 8-13, and 22-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 7.

### ***Information Disclosure Statement***

4. The information disclosure statement (IDS) submitted on November 2, 2004 has been considered.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 15-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. 6,077,450) in view of Joo (U.S. 6,342,425).

Lee teaches forming a rare metal layer above a semiconductor substrate formed with semiconductor elements, forming an insulating mask layer (silicon oxide) on the rare metal layer, patterning the rare metal layer by using the patterned insulating mask layer (col. 3, lines 10-15, 20-28). Lee teaches forming a metal nitride layer on the rare metal layer (Fig. 3a, col. 3, lines 5-12). Lee teaches terminated patterning the insulating mask before the rare metal layer is exposed and patterning the metal nitride and the rare metal layer by using the patterned insulating mask layer (the resist pattern is removed before patterning the metal nitride layer) (Fig. 3b-3d, col. 3, lines 10-35). Lee does not show using hydrogen-containing gas to form the metal nitride layer

Lee does not specifically show the semiconductor substrate having a lower electrode, forming a TEOS based silicon oxide film, annealing the semiconductor substrate in hydrogen-containing gas, the rare metal layer being an upper electrode of the capacitor. However, Joo discloses forming a dielectric film on the patterned lower electrode (Fig. 3D, col. 4, lines 20-25). Joo describes fabricating the capacitor having

Art Unit: 2822

the lower electrode (50) and the upper electrode (rare metal) (70) (col. 3, lines 50-65, col. 4, lines 32-60). Joo teaches forming a TEOS based silicon oxide film, and annealing the semiconductor substrate in hydrogen-containing gas (the thermal process inherently discloses this step) (col. 4, lines 60-67, col. 5, lines 1-5).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Lee reference by including the formation of the lower and the upper electrodes as taught by Joo in order to complete a capacitor without damaging the structure during patterning and improving the capacitor characteristics.

6. Claims 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee (U.S. 6,077,450) in view of Joo (U.S. 6,342,425) and Hasegawa et al. (U.S. 6,452,274).

Lee teaches forming a rare metal layer above a semiconductor substrate formed with semiconductor elements, forming an insulating mask layer (silicon oxide) on the rare metal layer, patterning the rare metal layer by using the patterned insulating mask layer (col. 3, lines 10-15, 20-28). Lee teaches forming a metal nitride layer on the rare metal layer (Fig. 3a, col. 3, lines 5-12). Lee teaches terminated patterning the insulating mask before the rare metal layer is exposed and patterning the metal nitride and the rare metal layer by using the patterned insulating mask layer (the resist pattern is removed before patterning the metal nitride layer) (Fig. 3b-3d, col. 3, lines 10-35).

Lee does not specifically show the semiconductor substrate having a lower electrode forming a dielectric film over the semiconductor substrate, forming a TEOS based silicon oxide film, the insulating mask being a TaO layer, and the rare metal layer

being an upper electrode of the capacitor. However, Joo describes fabricating the capacitor having the lower electrode (50) and the upper electrode (rare metal) (70) (col. 3, lines 50-65, col. 4, lines 32-60). Joo discloses forming a dielectric film over the semiconductor substrate and forming a TEOS based silicon oxide film (Fig. 3D, col. 4, lines 20-25). Hasegawa et al. shows TaO being used instead of silicon oxide as a mask as conventional in the art (col. 21, lines 1-8).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Lee reference by including the formation of the lower and the upper electrodes as taught by Joo and the insulating mask being a TaO layer as taught by Hasegawa et al. in order to complete a capacitor without damaging the structure during patterning, improving the capacitor characteristics and increasing etch selectivity.

#### ***Allowable Subject Matter***

7. Claims 29-32 are objected to, but would be allowable if are rewritten to overcome the informalities described above.

#### ***Response to Arguments***

8. Applicant's arguments with respect to claims 15-16, 19, 25 and 27 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2822

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

December 15, 2004

*Maria Guerrero*  
MARIA F. GUERRERO  
PRIMARY EXAMINER